FRACTURE SCAPHOID

SCAPHOPID FRACTURES: INTRODUCTION

- Scaphoid fractures constitute 60-70 % of all carpal bone fractures
- Second only to the distal radius in frequency
- Due to the importance of scaphoid in wrist mechanics and because of the frequency of the fracture in young adult male, it has an economic as well as physical significance
- Uncommon in children because the physis of distal radius fails first

BLOOD SUPPLY

- Major blood supply comes from the scaphoid branches of the radial artery entering the dorsal ridge at or just distal to waist area and supplying 70-80 % of the bone including the entire proximal pole - in a retrograde fashion
- Second group of vessels, arise from palmar & superficial palmar branches of radial artery & enter the distal tubercle, it perfuses distal 20-30 % of bone, including tuberosity.
- There are no anastomoses between the dorsal and palmar vessels
- Fractures across scaphoid may destroy blood supply to its proximal part

Rule of 70's for scaphoid

- 70% of all carpal fractures occur at scaphoid.
- 70% of blood supply is by the dorsal branch of the radial artery.
- 70% of fractures occur at the waist of scaphoid.
- 70% of the scaphoid fractures unite .

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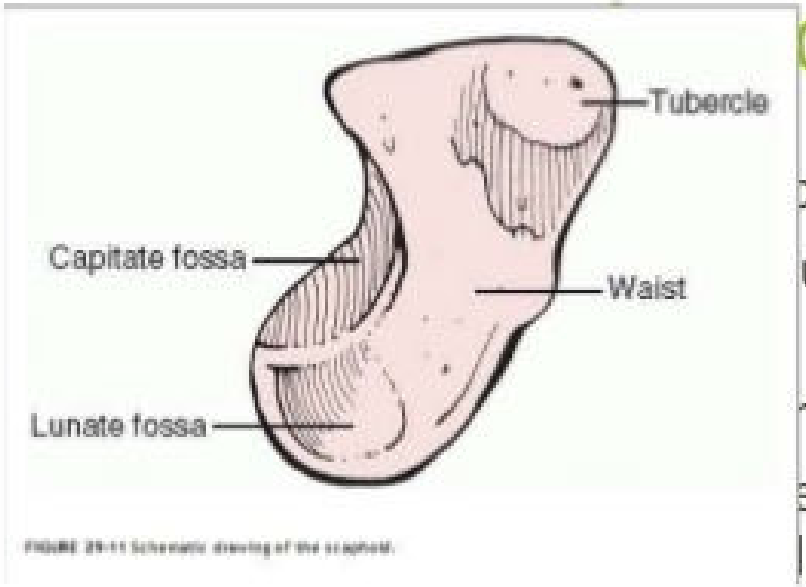


of proximal carpal row.

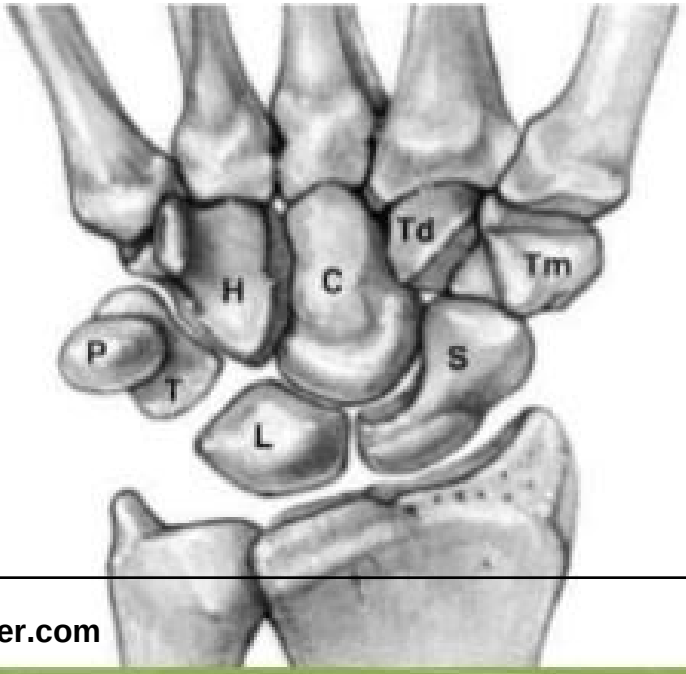
ular bone, twisted and

ne anatomic snuff box.

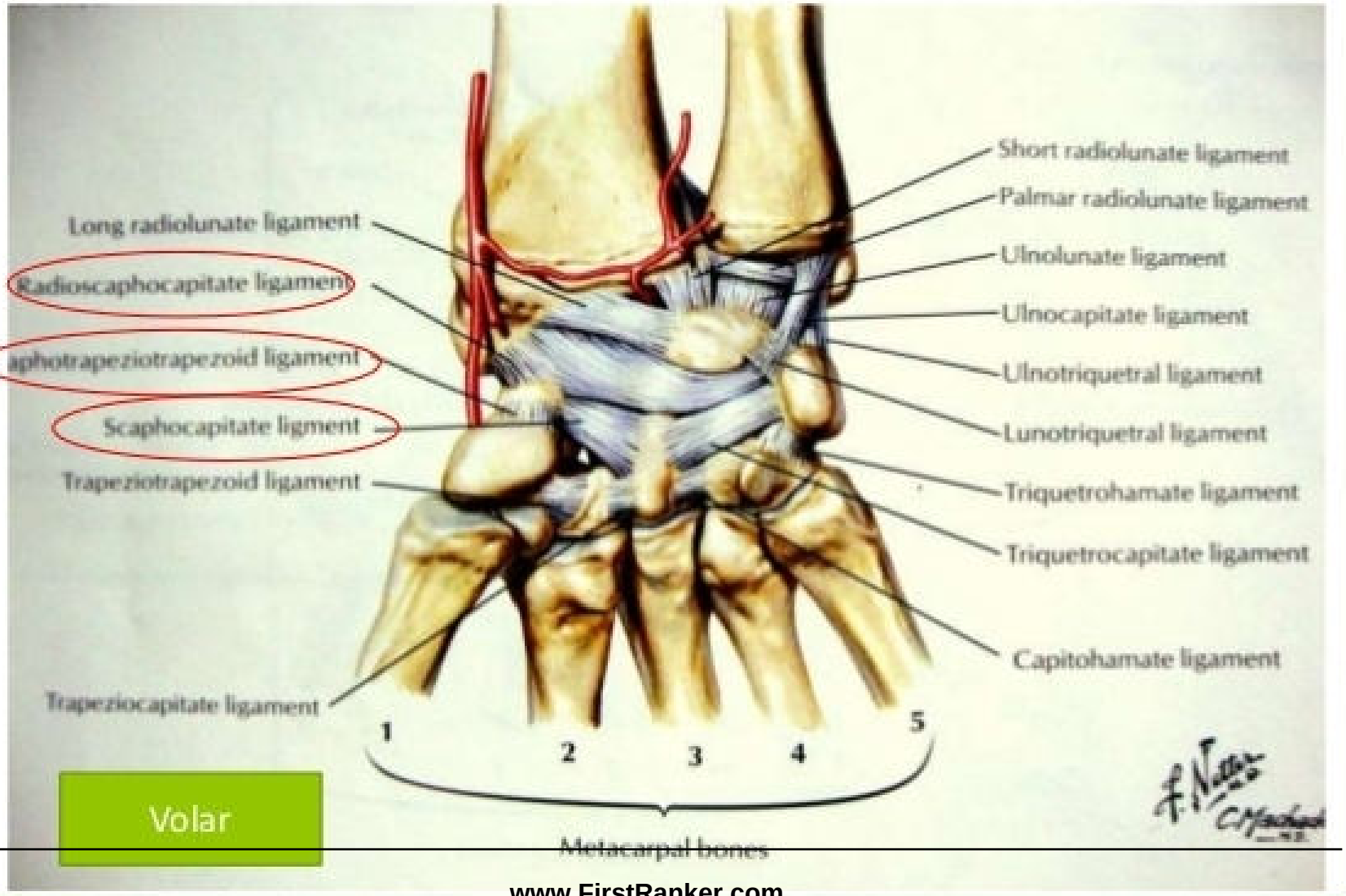
even smaller distal portion,

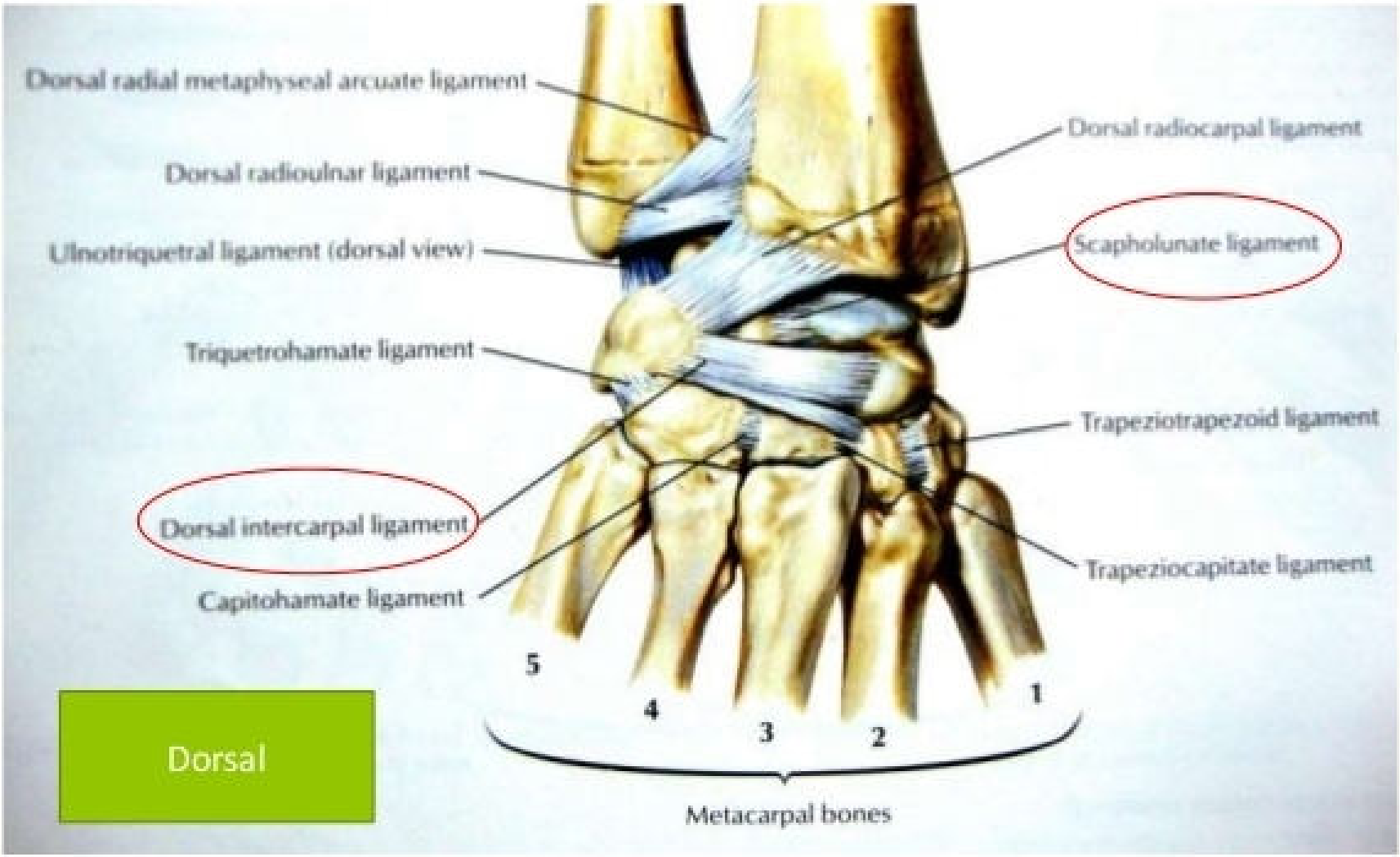
ls

- Distally, it articulates with the
  in a gliding motion, the articul
  forms a base for independent
- On the ulnar side, it articulate
  capitate, and proximally with t
  motion.
- Proximally, its large, biconvex
  with the radius.

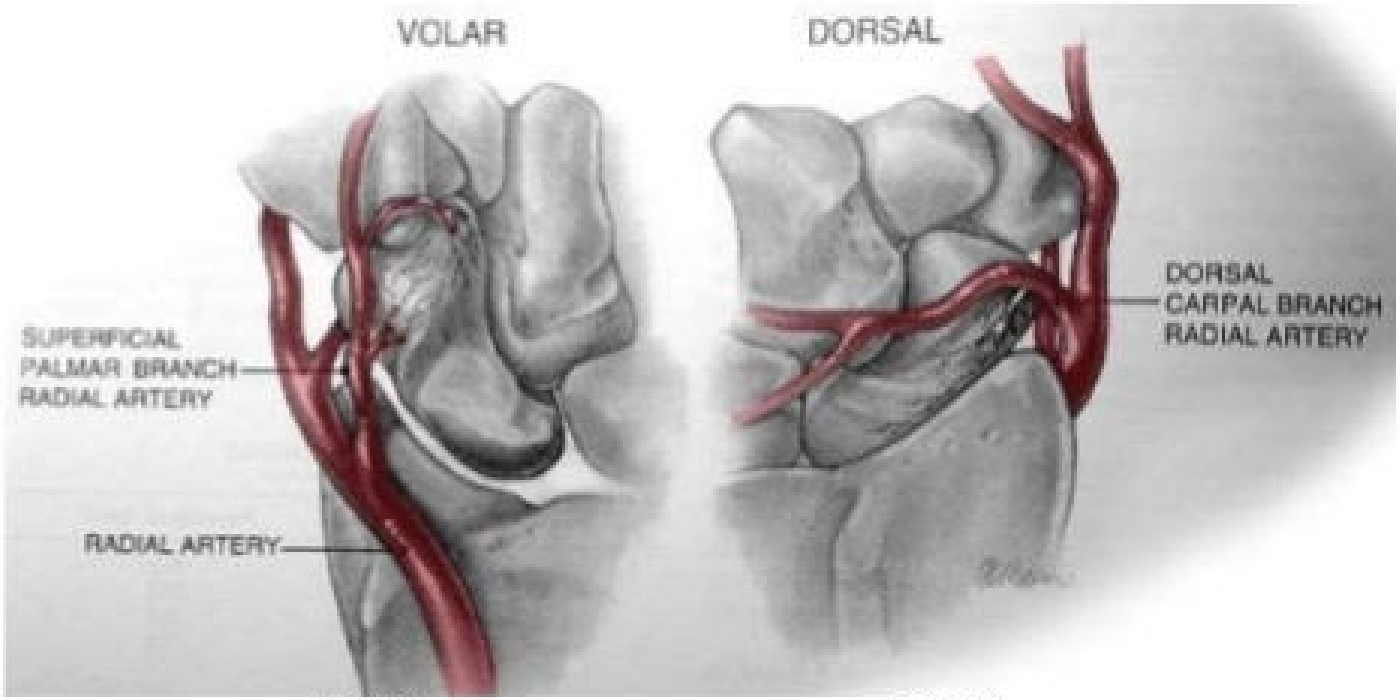


LIGAMENTS





Blood supply of scaphoid



30% 70%

Mechanism of injury

Two different mechanisms

- Compression injury: Usually results in non-displaced fracture
- Hyperextension bending injury: usually results in displaced fracture.

Diagnosis

- A strong index of suspicion is the key to early diagnosis
- The diagnosis should be based on :
  1. History
  2. Clinical examination
  3. Radiographic evaluation.

History

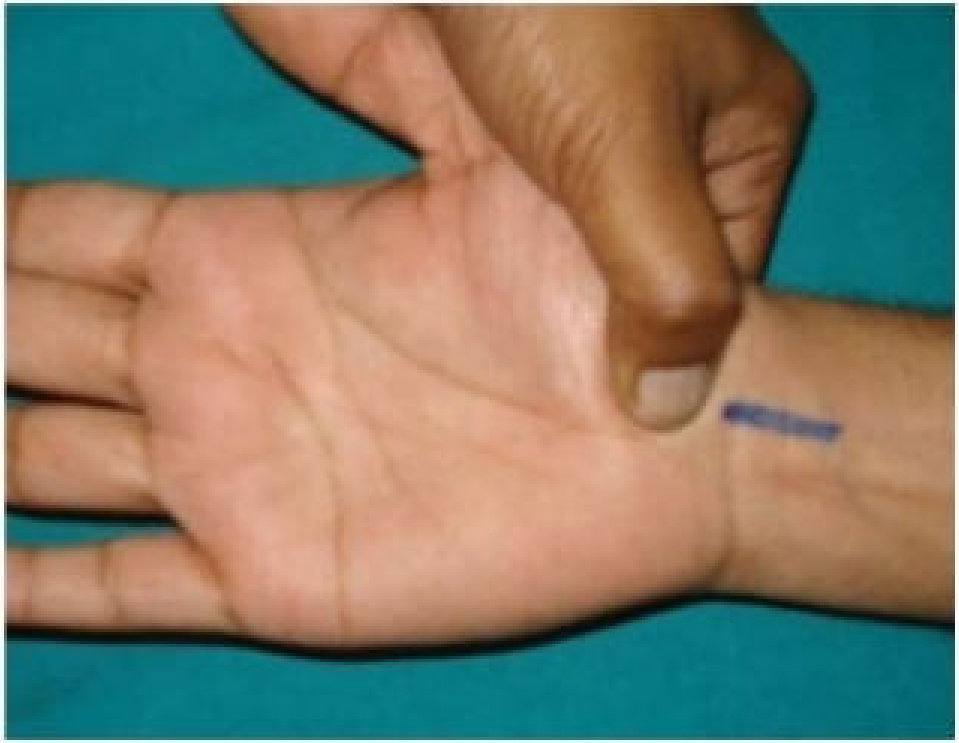
- Occurs after a fall on an outstretched hand, athletic injury, or Motor Vehicle accident
- Usually happens in young adult men
- Pain and swelling at the radial side of the wrist
- Inability or difficulty in moving the involved wrist
- Any Associated injuries.

Clinical examination

- Swelling and tenderness present in the anatomical snuff box

Scaphoid compression test

Scaphoid tubercle tenderness

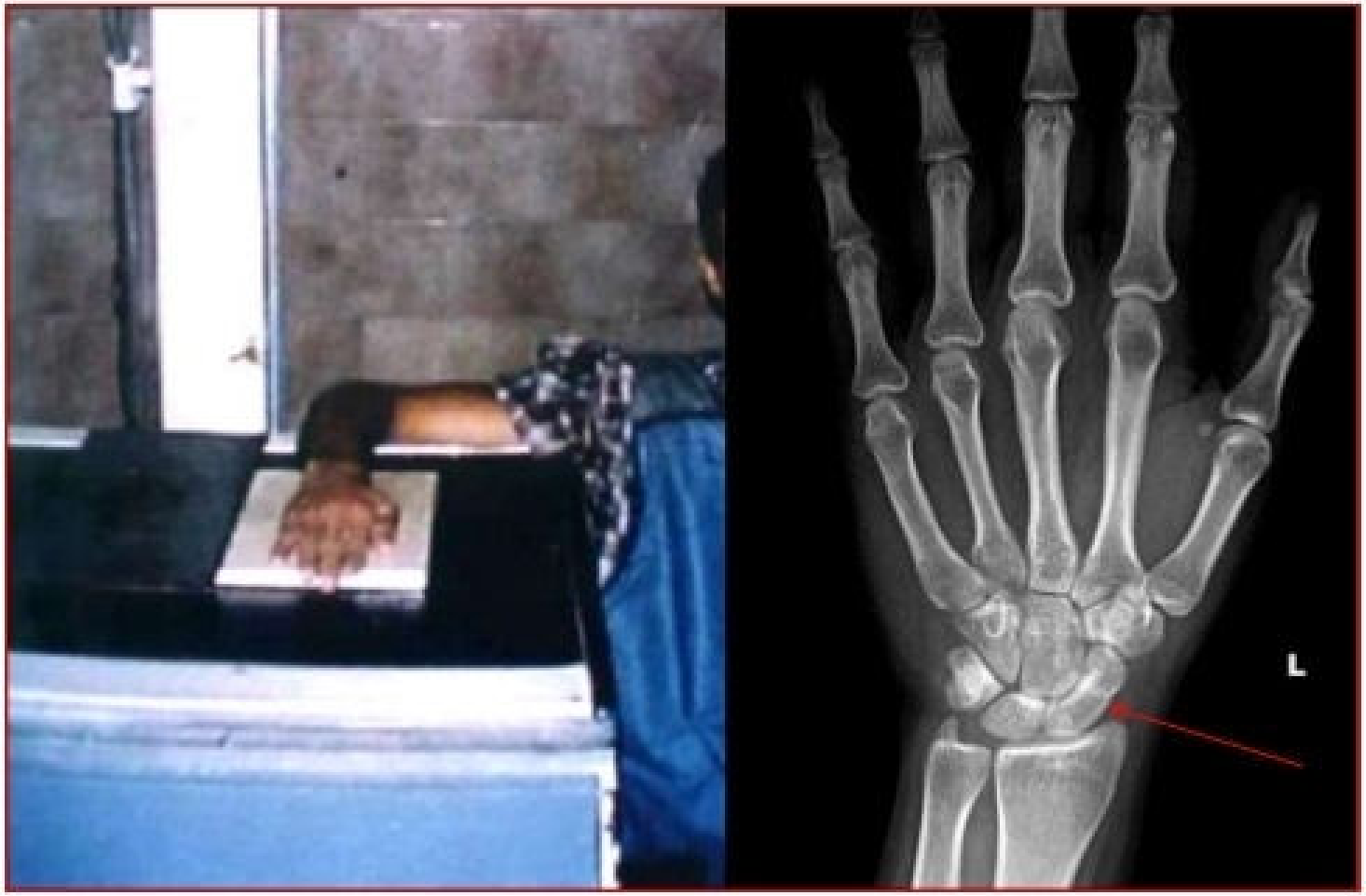


Painful resisted pronation

Radiographic evaluation

- Wrist PA, Lateral, Oblique, Scaphoid views
- 45 degrees pronated and supinated oblique views
- 5 views increased sensitivity and specificity to almost 100% (Mehta &Brautigan,1990)

Wrist PA



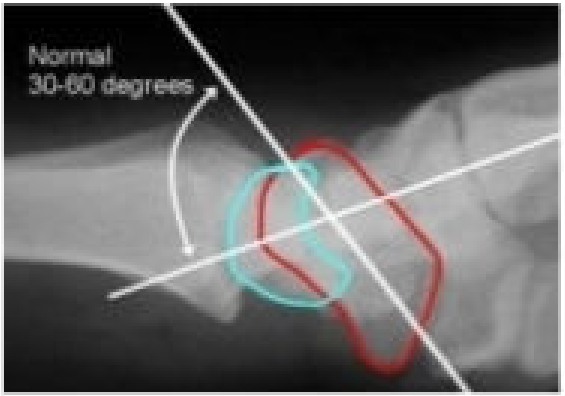
Wrist lateral

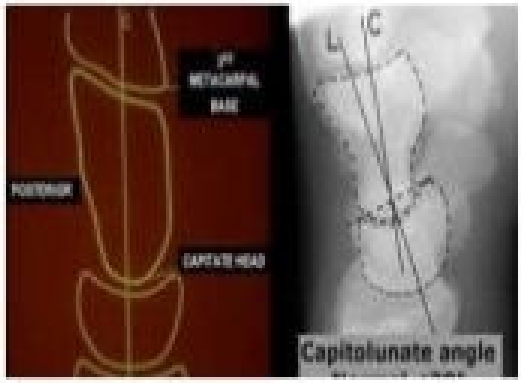
Scaphoid view

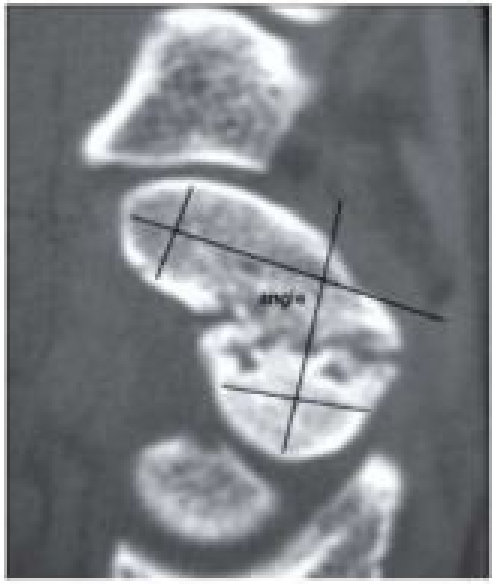
Supinated Oblique

Pronated Oblique

Important angles







SCAPHOLUNATE ANGLE
Normal---30 – 60 deg

CAPITOLUNATE ANGLE
Normal---<30 deg

INTRASCAPHOID ANGLE
Normal---AP < 35 deg
LAT < 45 deg

Bone Scan-Scintigraphy

- Fast and reliable diagnostic tool
- 100% Sensitivity

Disadvantages:

- Lacks specificity
- Little information regardin location
- 15% False positive

Computed Tomography

- Scan oriented to longitudinal axis of scaphoid for hump back deformity
- For surgical planning & assessment of healing
- To diagnose additional bony injuries

Disadvantages

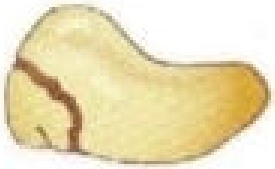
- False positives in diagnosing occult fractures.

MRI

- 2nd line test in negative radiographs
- Identifying occult scaphoid fractures,fractures of other carpal bones, ligament injuries
- Highest sensitivity and specificity

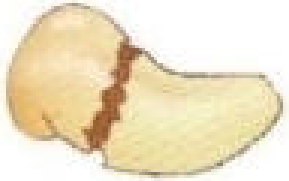
Classifications of scaphoid fractues

Anatomical



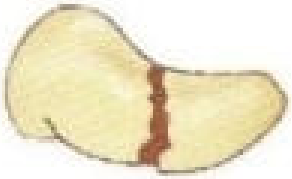
Distal articular surface

Distal tubercle



Distal third

10 %



Middle third

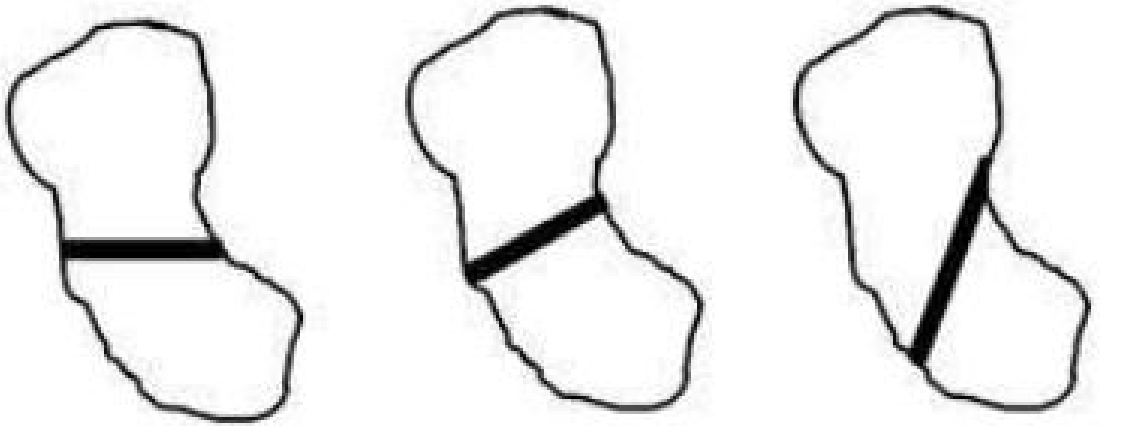
65 %

Proximal third

25 %

van Leerdam 2010

Russe's classification



D. Amount of fracture displacement (stability) :

- Undisplaced ---- stable
- Displaced ---- unstable

- NOTE: Amount of fracture displacement this is the most important classification and the practical one.
- As mentioned earlier undisplaced fx results from an impaction injury while the displaced fx results from hyperextension bending injury
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PROGNOSIS

- Negative prognostic factors are :
  - ✓ late diagnosis
  - ✓ proximal location
  - ✓ displacement
  - ✓ angulation
  - ✓ obliquity of the fracture line
  - ✓ smoking
  - ✓ carpal instability

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- **Displaced fractures :**
  - Primary internal fixation is treatment of choice for unstable scaphoid frxs
  - Fractures treated by primary internal fixation, average time for return to work is 3.7 weeks with union rate 97 %

Indications of Surgery in Scaphoid fractures

Displaced acute fracture

Delayed union or nonunion when bone grafting is insufficient to provide adequate internal fixation

S.Fx associated with a perilunate fx or dislocation

Ligamentous injury

Non displaced fx of proximal pole

Non displaced fx if the pt will not tolerate prolonged cast immobilization (e.g. professional athletes and manual laborers)

Complications of Scaphoid Fx

- Delayed union or Nonunion
- Malunion (Humpback deformity)
- SLAC wrist
- Osteonecrosis

Scapholunate advanced collapse (SLAC) of the wrist is the most common pattern of **degenerative** arthritis in the wrist